

Figure 1

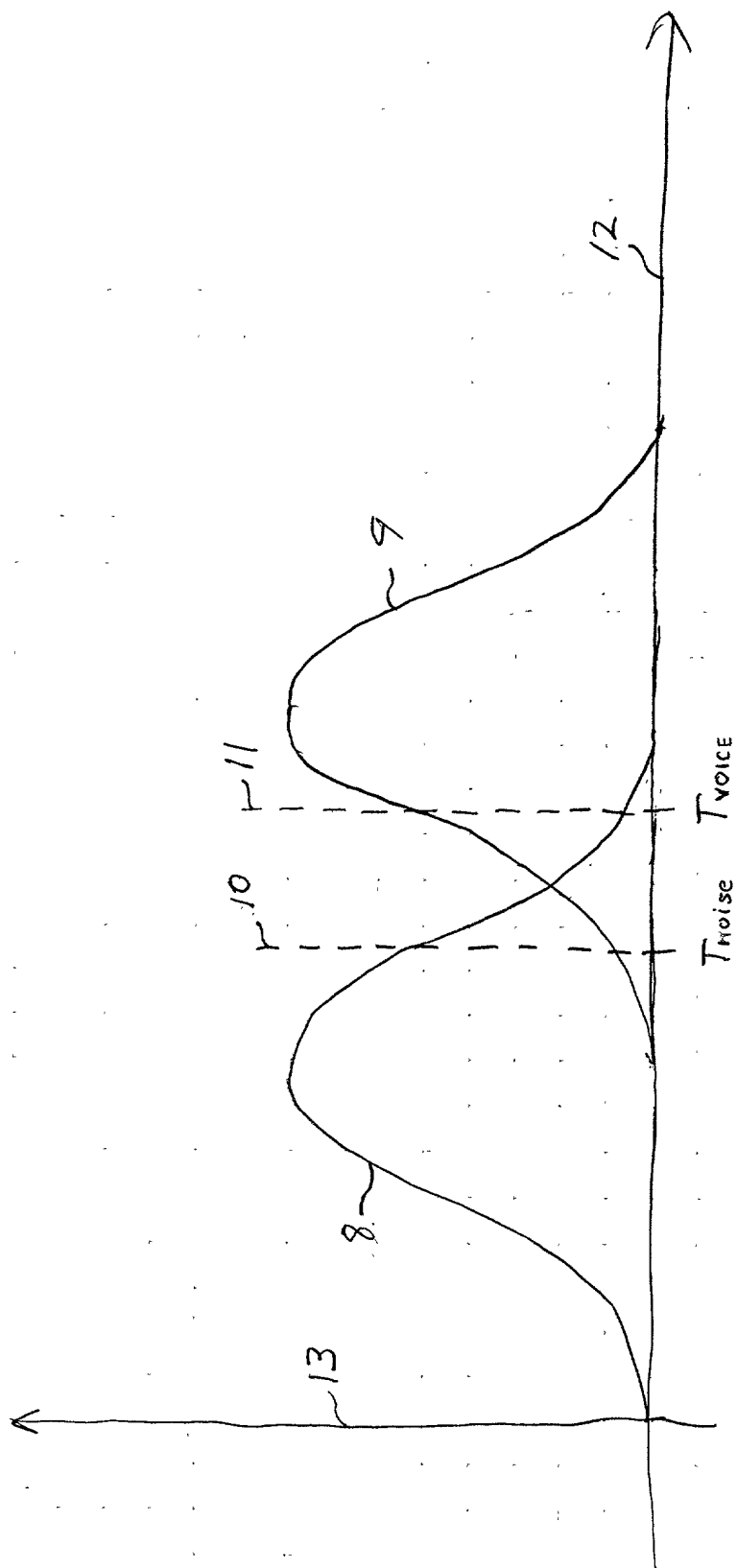


FIGURE 2

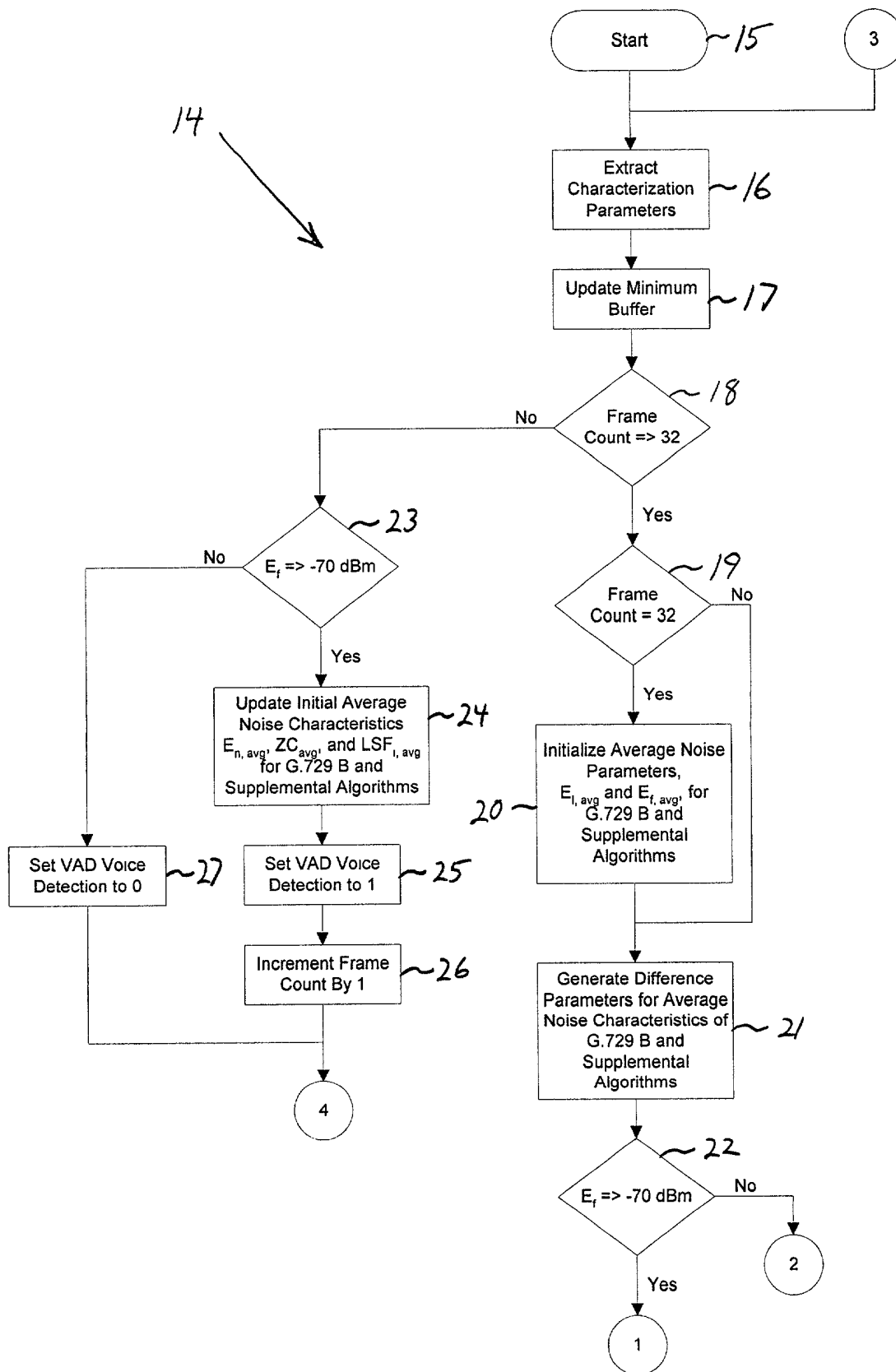


Figure 3

```

graph TD
    1((1)) --> 28[Make Multi-Boundary Initial VAD Decision]
    2((2)) --> 29[Set Initial VAD Decision to 0]
    28 --> 30[Make Smoothed Final VAD Decision]
    29 --> 30
    30 --> 31{Background Noise Energy Thresholds Met}
    31 -- No --> 4((4))
    31 -- Yes --> 32[Update Average Background Noise Parameters Used for G.729 B Algorithm]
    4 --> 32
    32 --> 33[Extract  $E_{f,max,i}$  &  $E_{f,min,i}$ ]
    33 --> 34[Establish  $T_{noise,i}$ ]
    34 --> 35{ $T_{noise,i-1} \Rightarrow E_i \Rightarrow -70$  dBm}
    35 -- No --> 3
    35 -- Yes --> 36[Update Average Background Noise Parameters Used for Supplemental Algorithm]
    36 --> 37{Time to Update  $T_{noise,i}$ }
    37 -- No --> 39{Time to Compare Parameters of G.729 B and Supplemental Algorithms}
    37 -- Yes --> 38[Update  $T_{noise,i}$ ]
    38 --> 39
    39 -- No --> 37
    39 -- Yes --> 40{Have G.729 B and Supplemental Algorithm Parameters Diverged}
    40 -- No --> 37
    40 -- Yes --> 41[Substitute Average Background Noise Parameters from Supplemental Algorithm for Those of G.729 B]
    41 --> 42{Last Frame in Link}
    42 -- No --> 3
    42 -- Yes --> 43([End])
  
```

The flowchart illustrates the G.729 B algorithm for background noise estimation and VAD decision. It begins with two initial steps: 'Make Multi-Boundary Initial VAD Decision' (28) and 'Set Initial VAD Decision to 0' (29), both leading to 'Make Smoothed Final VAD Decision' (30). From step 30, the process enters a loop starting with a decision 'Background Noise Energy Thresholds Met' (31). If the answer is 'No', it proceeds to step 4. If 'Yes', it goes to 'Update Average Background Noise Parameters Used for G.729 B Algorithm' (32), which also receives input from step 4. This is followed by 'Extract $E_{f,max,i}$ & $E_{f,min,i}$ ' (33), 'Establish $T_{noise,i}$ ' (34), and a decision 'Time to Update $T_{noise,i}$ ' (37). If 'No' to 37, it goes to 'Time to Compare Parameters of G.729 B and Supplemental Algorithms' (39). If 'Yes' to 37, it goes to 'Update $T_{noise,i}$ ' (38) and then to 39. From 39, if 'No', it loops back to 37. If 'Yes', it goes to 'Have G.729 B and Supplemental Algorithm Parameters Diverged' (40). If 'No' to 40, it loops back to 37. If 'Yes' to 40, it goes to 'Substitute Average Background Noise Parameters from Supplemental Algorithm for Those of G.729 B' (41). Finally, it reaches a decision 'Last Frame in Link' (42). If 'No', it proceeds to step 3. If 'Yes', it ends at step 43.

Figure 4

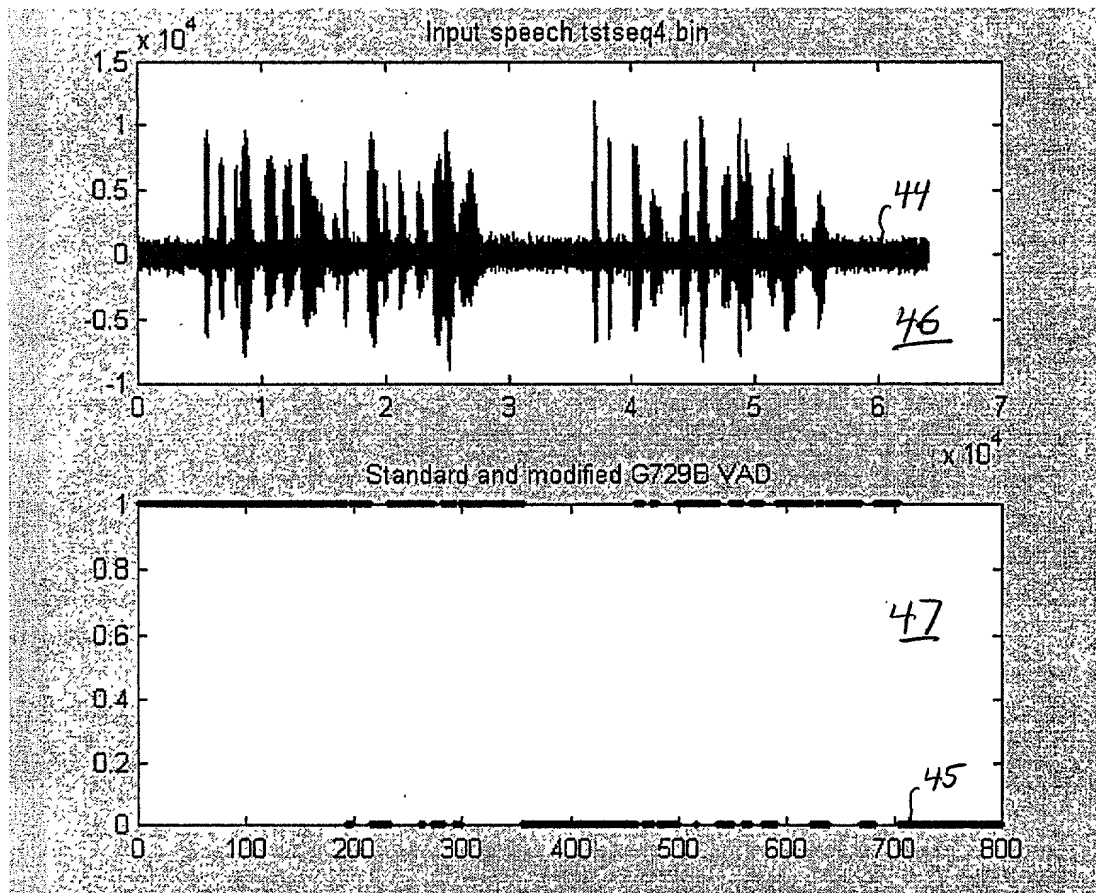
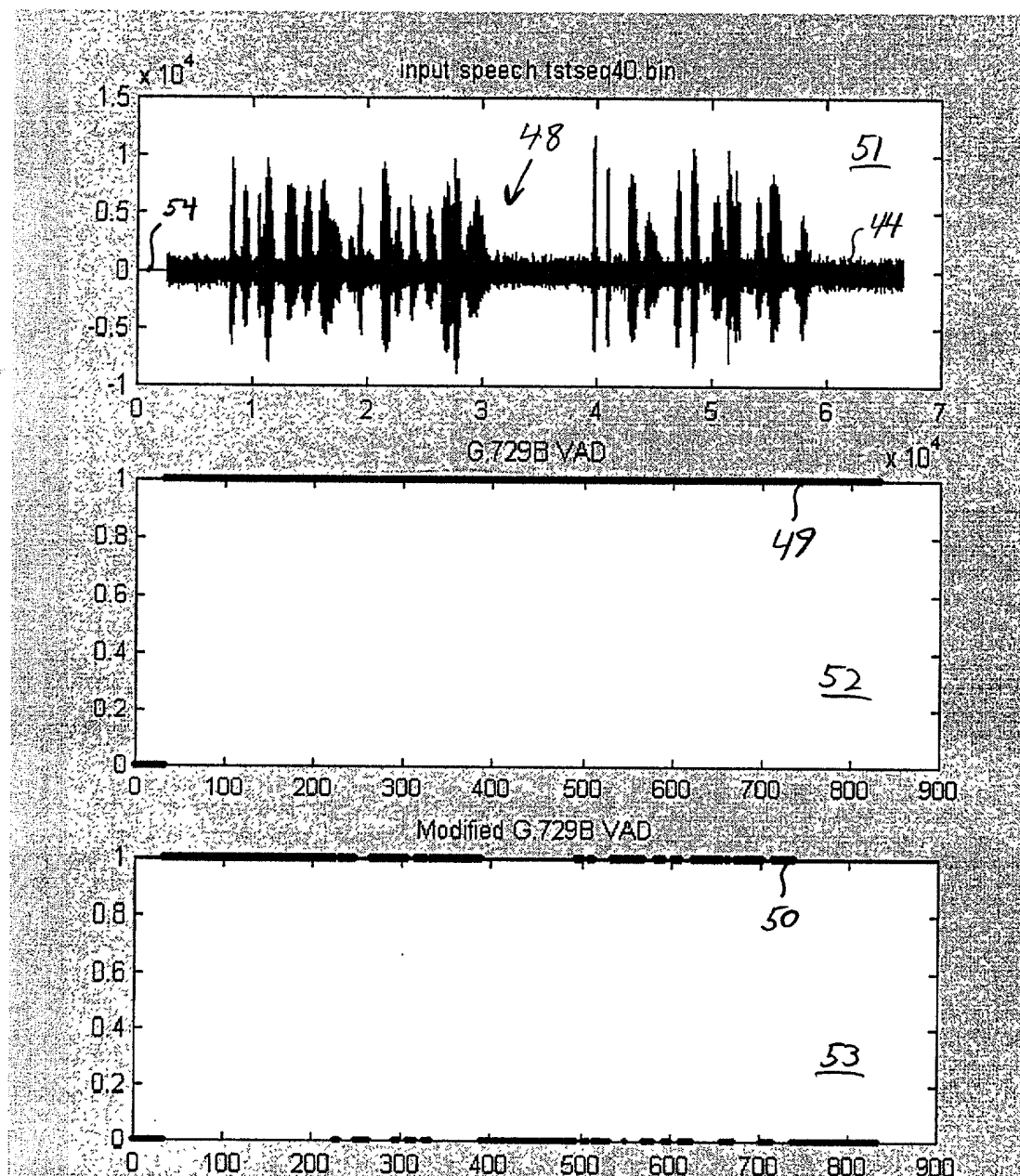


Figure 5



6

Figure Comparison of standard and modified G.729B VAD results
Input signal is test vector tstseq40.bin with low level signal in front.

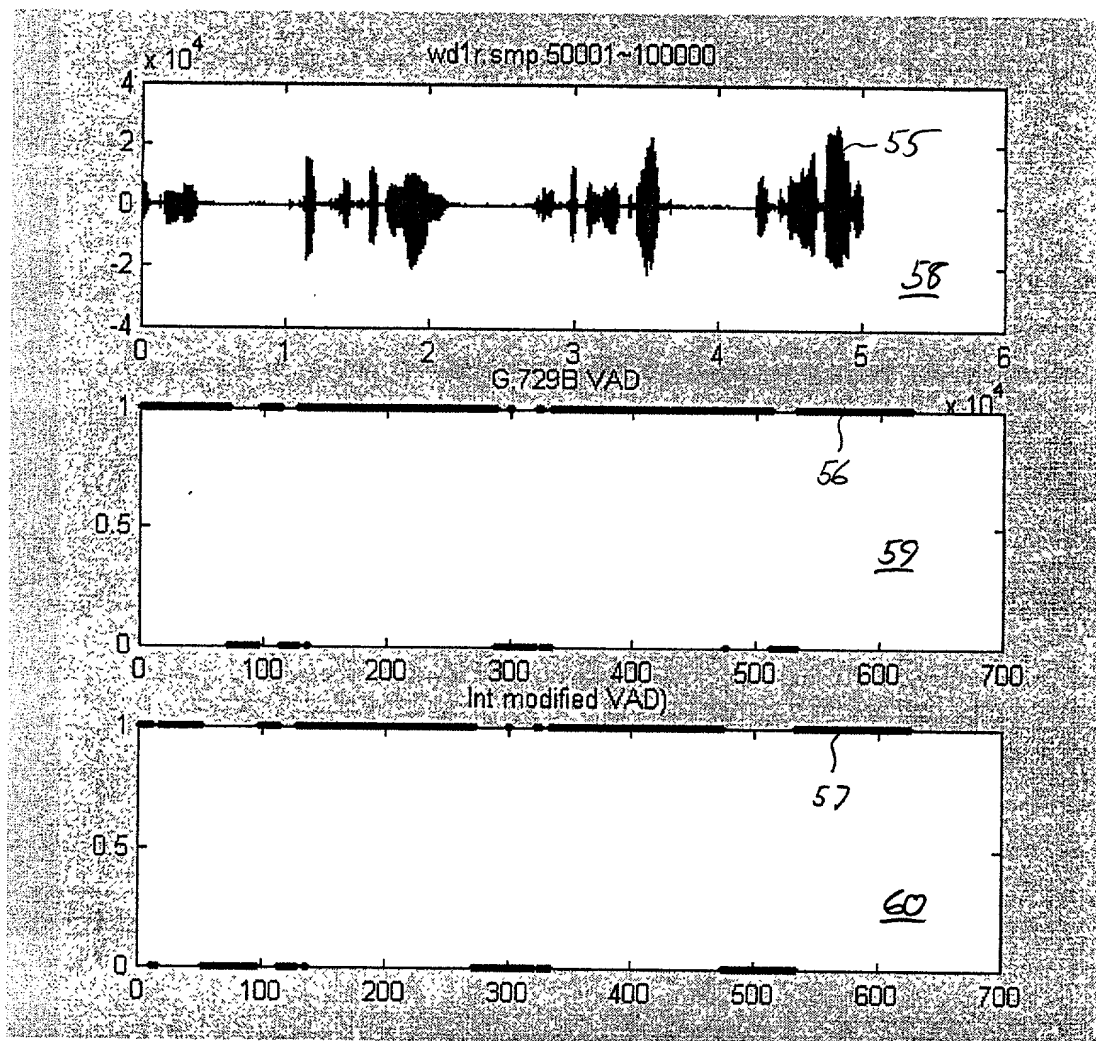


Figure 7 Comparison of standard and modified G.729B VAD results
Part of wd1.wav (right) waveform

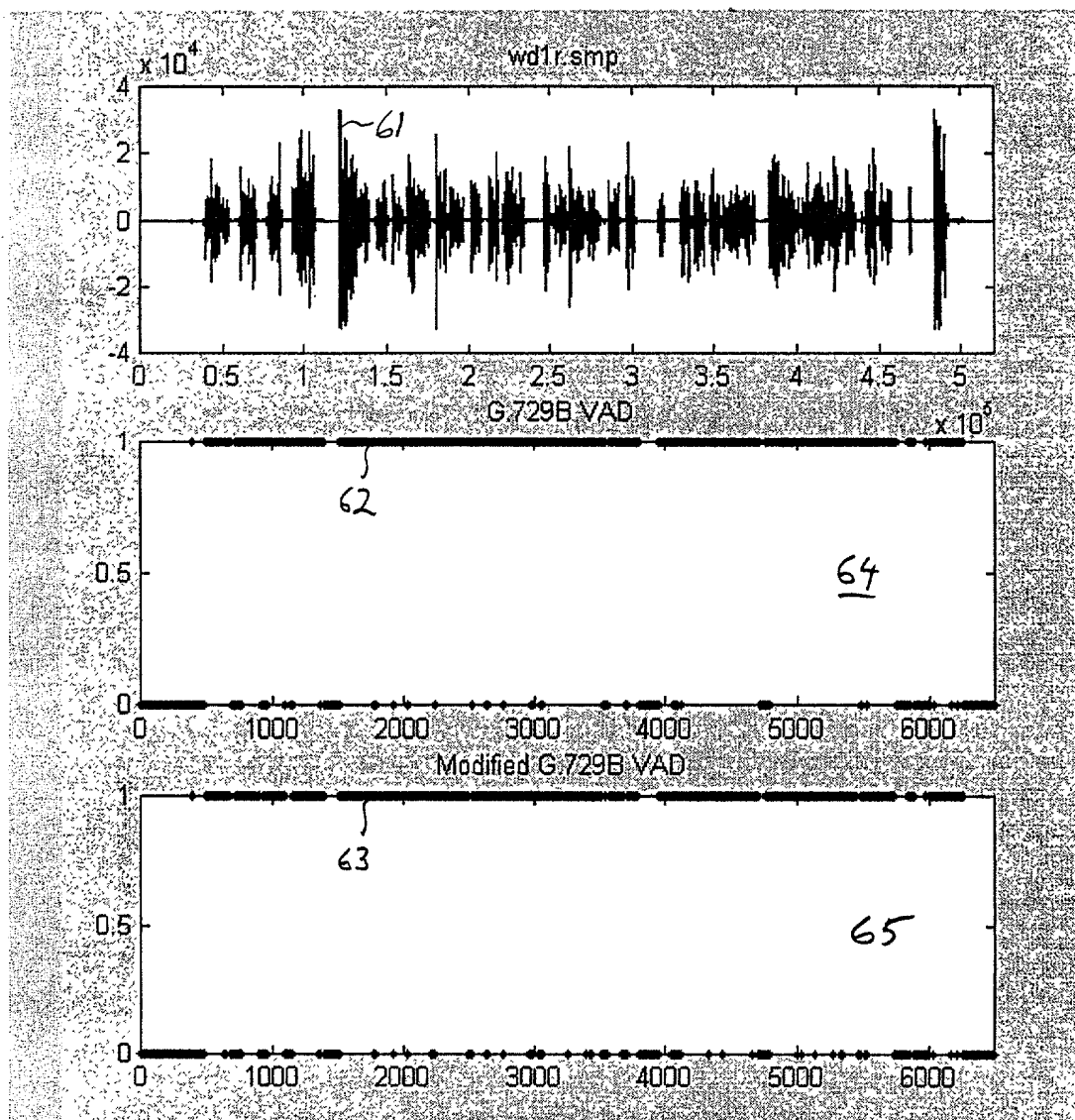


Figure 8 Comparison of standard and modified G.729B VAD results
Input signal is wd1.wav (right)